Evaluation of bacterial profile with serum CRP, RF and anti-CCP antibodies in acute and chronic tonsillitis patients in Babylon province

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Summary
This study compares the diagnostic of "Tonsillitis" is inflammation of the pharyngeal tonsils and is also known as pharyngitis to extend the inflammation to the adenoid and the lingual tonsils. Most cases of bacterial tonsillitis occur group β-"hemolytic Streptococcus pyogenes" (GABHS), "S. aureus" generally. The current study aims to bacterial profile assessment with serum CRP, antibodies RF, and Anti-CCP in acute & chronic tonsillitis patients in Babylon Province. Completely, (45) a sample of blood and swabs of (22-56) years of male and female tonsillitis patients. Sera antibodies of (CRP, RF, and anti-CCP) identified by serological techniques for every one of these patients. Results showed that the culture of the samples gave all patient 45 positive growths and the presentation of the positive conclusion in grams of positive bacteria and negative grams depending on the staining. The highest percentages of S. pyogenes and S. aureus in patients with tonsillitis of other pathogens. Additionally, it is the highest proportion of tonsillitis disease is unlike the healthy individual's group according to different criteria by age group (21-59) years, disease duration (4-13) years, females and autoantibody tests (CRP, RF, and Anti-CCP antibodies) in patients with tonsillitis patients (acute & chronic). Our study concluded that it is important to determine the values of these criteria for their effects on patients suffering from acute and chronic tonsillitis.

Key words: Tonsillitis, CRP, RF, anti-CCP antibodies


Introduction
Ear, nose and throat maladies (ENT) influence grown-ups and kids with serious weakness in everyday life. "Upper respiratory infections" (URTIs), including "nasopharyngitis", "pharyngitis", "tonsillitis", inflammation of the middle ear, represent a large proportion of the total respiratory tract infections [1]. Tonsillitis is a sickness that every now and again happens with wide worldwide distribution. Streptococcus pyogenes (group A) is as yet the most successive reason for tonsillitis and can prompt a few squeals (severe post-infection sequence) including rheumatic fever and glomerulonephritis. Tonsils are part of the immune system, which protects the body and helps fight infections, Tonsils are part of the immune system, which protects the body and helps fight infections, which are organs situated on
the two sides of the back of the throat and tonsillitis is an agonizing irritation \cite{2, 37}. Symptoms Related with it: fever and chills, swollen lymph organs in throat and neck, headache, sinus obstruction, ear infection, and quiescence. It is normal and can happen at any age, yet typically most influence kids and youthful adults \cite{3, 4}. Recurrent tonsillitis may provoke to ceaseless tonsillitis. This can cause breathing difficulties, sleep apnea, and abscesses on the tonsils. Chronic tonsillitis is an indication of the overload of the lymphatic system, responsible for the detoxification of the body. When the lymphatic system is overloaded it leads to infection \cite{5}. All patients undergo a general examination and must be extended according to the signs and symptoms \cite{6}. At least, the examination should look for: signs of dehydration, rash, enlarged or pharyngeal tonsils with or without secretions, scleroderma or peritonal abscess (quinsy), hypertrophic cervical lymph nodes, cervical lymphoma, and membrane hypertrophy mucous mouth tumor change. \cite{7, 8}.

"C-receptive protein (CRP)" is a protein phase model of human acute, a particle consisting of five atoms contains 5 sub-units that cannot be distinguished each 23 kDa. The distinction CRP for the first time, described by Tillet and Francis in 1930 by its capacity to link part C of *Streptococcus pneumonia*. In the acute phase response, can concentrations rise in CRP within a few hours, up to 1000 times higher than normal \cite{9}. On account of its role as a protein acute phase typical, it occupies a prominent place among the most rated in clinical medicine molecules, broadly utilized by doctors to screen intense stage, like in pneumonia, sepsis, skin and delicate tissue contaminations, & "trauma", furthermore in response to control the patient's reaction to antibiotic treatment Moreover, it's a pointer of action in immune system maladies \cite{10, 11}. Rheumatoid factor (RF) is a counter acting agent of the Fc segment of human "IgG", has been generally viewed as a sign of the criteria for symptoms of "RA" that was created by the "American College of Rheumatology (ACR)". The sensitivity and specificity of RF were reported to diagnosis rheumatoid arthritis within 50- 80% and 70 to 80%, respectively. It is known that the privacy of the RF test is relatively weak and is frequently addressed. With around 5% false positivity in the all-inclusive community, RF is found in numerous patients with different ailments of autoimmune disease or infectious. In recent years, many studies have shown that antibodies against the cyclic cycloid peptide (CCP) are increasingly apparent (about 98%) and can be used as a sign of early warning and rheumatoid arthritis \cite{12}. This study aims to assess the bacterial profile by blood serum CRP, RF & Anti-CCP of acute and chronic tonsillitis patients in Babylon Province.

**Materials and methods:**

**Sample collection:**
The study included 54 blood samples and swabs collected from patients with tonsillitis from males and females aged 22-56 year presented with (2-4) week history of sore throat, with tenderness along the right shows mild swelling sternocleidomastoid muscle, Clinical examination was remarkable in erythema nasopharyngeal secretions with tonsillitis, lymphadenopathy cervical, which was admitted to Hilla General Education hospital during the period from October 2018 to April 2019. Swabs of the patient tonsils were collected by sterile disposable transport. The swabs were taken and closed until they were transferred to the laboratory in college. Cultivation was performed on different media for 24
hours at 37 °C for bacterial diagnosis according to standard biochemistry tests, then the identification was confirmed by using API system strips (Biomerieux, Marcy-l’Etoile, France).

**Serum preparation**

5ml of blood was withdrawn by a disposable syringe, blood was divided into one part to perform some hematological tests the other part put in a serum plane tube without anticoagulant. The serum was centrifuged at about 3000 rpm for 5 min.\[^{13}\]

**Serum "C-reactive protein (CRP)" detection:**

Based on "Humatex CRP KIT" the immune reaction of human CRP (for a sample of patients or controls the sera) and corresponding anti-CRP antibodies associated with latex molecules. Positive interaction is indicated by a clear visual stacking of the latex particles in the test cell on the slide. This group has detected 6 mg / L of CRP in the patient's serum limit. The test is positive when the concentration of CRP in the serum is higher than 6 mg / liter & negative at 6 mg / L or less\[^{14}\].

**"Rheumatoid factor (RF)" detection:**

In our lab, "RF" detection was routinely tested in a latex stacking method as described in the 'VEDALAB (France)" method. It has been reported as a result of qualitative. The serum that was stacked with latex particles is considered positive\[^{15}\].

**Detection of anti-citrullic peptide (CCP):**

Put together by ELISA, AESKULISA (Aesku, Wendelsheim, Germany). The standard convention is adhered to as per the maker's directions. Results were accounted for subjectively with reading> 18U/ml positive\[^{16}\].

**Results**

**Lab values:**

They were important to significantly increase the number of white blood cells (WBC) (15,500 /μL, 80% of neutrocytes), increased inflammatory markers [CRP (208mg / L), ESR (122mm / hr), PCT (2.56pg / mL)].

**Isolation of bacteria:**

In this study, sample culture (45) appears positive growth and (0) with no growth, as shown in Figure (1-1). The positive distribution of culture.

**Isolation of bacterial causatives in tonsillitis patients:**

The bacteriological study included acute and chronic tonsillitis. In acute tonsillitis results indicated the occurrence of *Staphylococcus aureus* 22(23.1%), followed by *Streptococcus pyogenes* 20(21%), *Streptococcus pneumoniae* and *Haemophilus influenzae* 16(16.8%) for each of them, *Streptococcus viridans*9(9.4%), *Klebsiella pneumoniae* 5(5.2%), *Pseudomonas aeruginosa* 4(4.2%) and *Escherichia coli*3(3.1%), whereas in chronic tonsillitis indicated the occurrence of predominant *Streptococcus*
pyogens 25(19.6%), followed by Staphylococcus aureus 21(16.5%), Haemophilus influenzae 22(17.3%), Streptococcus pneumoniae 18(14.1%) Streptococcus viridans 16(13.5%), Klebsiella pneumonia 13(10.2%) Pseudomonas aeruginosa 7(5.5%) and Escherichia coli 5(3.9%) Table (1-1). The highest percentages of S. pyogenes and S. aureus in tonsillitis patients more than other bacterial causatives agreed with the results of [17, 18]. The highest percentages of tonsillitis disease, unlike the control group according to diverse parameters such as age group (21-59) years, disease duration (4-13) years, gender and autoantibody tests (CRP, RF and anti-CCP antibodies), for Tables (4-2 and 4-3) in tonsillitis (acute and chronic) and all these outcomes are harmonious with the consequences of [19, 20].

Table (1-1): The prevalence and percentage of bacteria isolated from acute and chronic tonsillitis patients.

<table>
<thead>
<tr>
<th>Type of bacteria</th>
<th>Acute</th>
<th>Chronic</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. pyogens</td>
<td>10(22.2%)</td>
<td>9(20%)</td>
<td>19(42.2%)</td>
</tr>
<tr>
<td>S. aureus</td>
<td>10(22.2%)</td>
<td>7(15.5%)</td>
<td>17(37.7%)</td>
</tr>
<tr>
<td>H. influenzae</td>
<td>8(17.8%)</td>
<td>8(17.7%)</td>
<td>16(35.5%)</td>
</tr>
<tr>
<td>S. pneumoniae</td>
<td>8(17.8%)</td>
<td>6(13.3%)</td>
<td>14(31.1%)</td>
</tr>
<tr>
<td>S. viridans</td>
<td>4(8.8%)</td>
<td>6(13.3%)</td>
<td>10(22.2%)</td>
</tr>
<tr>
<td>K. pneumoniae</td>
<td>2(4.4%)</td>
<td>5(11.2%)</td>
<td>7(15.5%)</td>
</tr>
<tr>
<td>PS.aeruginosa</td>
<td>2(4.4%)</td>
<td>2(4.4%)</td>
<td>4(8.9%)</td>
</tr>
<tr>
<td>E. coli</td>
<td>1(2.2%)</td>
<td>2(4.4%)</td>
<td>3(6.6%)</td>
</tr>
<tr>
<td>Total number</td>
<td>95</td>
<td>127</td>
<td>222</td>
</tr>
</tbody>
</table>

Table (1-2): Baseline characteristics of patients included in the study.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Patients (n=80)</th>
<th>Control (n=80)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean± SD</td>
<td>Range</td>
<td>Mean± SD</td>
</tr>
<tr>
<td>Age (year)</td>
<td>40.6 ± 11.07</td>
<td>21-59</td>
<td>37.2 ± 9.58</td>
</tr>
<tr>
<td>Disease duration (year)</td>
<td>8.0 ± 1.5</td>
<td>4-13</td>
<td>-</td>
</tr>
<tr>
<td>Gender(F/M)</td>
<td>29/16</td>
<td>-</td>
<td>25/ 20</td>
</tr>
<tr>
<td>RF (U/ml)</td>
<td>38.47 ± 28.8</td>
<td>6.7-104</td>
<td>26.69 ± 17.44</td>
</tr>
<tr>
<td>CRP (mg/dl)</td>
<td>30.95 ± 21.39</td>
<td>5.97-78</td>
<td>21.45 ± 13.64</td>
</tr>
<tr>
<td>Anti-CCP (U/ml)</td>
<td>29.55 ± 23.21</td>
<td>3.5-90.5</td>
<td>17.58 ± 5.53</td>
</tr>
</tbody>
</table>

Table (1-3): Frequency of occurrence of different auto-antibodies assessed at baseline in tonsillitis and non-tonsillitis subjects.
Discussion

The first defense mechanism specialized in fighting bacteria and viruses that enter the body through the mouth are tonsils, and this function makes them susceptible to inflammation and infection. Bacteria isolated from acute and permanent tonsillitis patients were reported in Table (4-1). In many cases, they are caused by bacterial of streptococcus or a viral infection. Nearly (30 - 40%) documented was caused by the Streptococcus of Group A β-hemolytic (GABHS) [21]. The commonest ailment happening in more youthful age groups is Bacterial tonsillitis, this is due to inflammation inside the tonsils. They were unable to identify the risk factors and complications associated with the disease. In most cases of chronic inflammation polymicrobial of bacteria tonsillar, the presence of species of Staphylococcus aureus alpha and beta-hemolytic notes and other of the bacterial genus [22,38,39]. Characteristics of the patients included in the examination as in Table (1-2). The highest rates of tonsillitis are in contrast with the control group according to different criteria as in the age group (21-59 years), duration of disease (4-13 years), female tests and antibodies "(CRP, RF and anti-CCP antibodies)”, for Tables (4.2 and 4.3) in tonsillitis (acute and chronic) and each of these findings are consistent with the results [23].

The frequency of various auto-antibodies was assessed mainly in tonsillitis and non-tonsillitis (as in Table 4.3), as follows: CRP levels are a major component of the acute phase response. As part of the body's immediate defense system, serum CRP concentrations can increase to 1000 times within 24-72 hours of injury or tissue insult. Therefore, the marker is sensitive to systemic inflammation and rises in patients with rheumatoid arthritis and other diseases (e.g. tonsillitis) [24] The concentration of reactive protein (CRP) is significantly higher, an acute-phase protein that produces a response to diffuse cytokines from inflammatory foci is a pointer of bacterial contamination. It can be detected increased levels of CRP during (6-12 hours) of bacterial infection by rapid test. Studies have shown that the estimate of CRP is useful in determining bacterial sinusitis when everything is said in practice. As with the effect of CRP estimation on endorsing of anti-infection agents in patients with respiratory tract contaminations, however, there are inconsistent outcomes [25, 26]. RF levels were higher in tonsillitis than in control bunch in Table (1-2), and in tonsillitis than non-tonsillitis bunch in Table (1-3) [27, 28].

Anti- CCP levels: This study demonstrated that citrulline is a fundamental constituent of an antigenic determinant for tonsillitis specific autoantibodies that prompted the advancement of "anti- CCP”. It was endorsed for the diagnosis of RA. The test is respectably delicate (41-80% relying upon the cohort study) and around 90-98% explicit for the conclusion of RA. Anti-CCP can show up in both early and advanced RA cases and their essence predicts the improvement of RA in obviously sound people

<table>
<thead>
<tr>
<th>Autoantibody</th>
<th>Tonsillitis</th>
<th>Non-Tonsillitis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+ve response</td>
<td>-ve response</td>
</tr>
<tr>
<td>RF (U/ml)</td>
<td>27</td>
<td>18</td>
</tr>
<tr>
<td>CRP (U/ml)</td>
<td>34</td>
<td>11</td>
</tr>
<tr>
<td>Anti-CCP (U/ml)</td>
<td>18</td>
<td>27</td>
</tr>
</tbody>
</table>


before the event of clinical indications and in patients with joint pain] undifferentiated [29, 30, 31]. It was added inspiration for anti-CCP standards to the conclusion of the new RA American College of Rheumatology (ACR) in 2010. Altogether numerous information bolsters utilizing Anti-CCP antibodies for recognizing RA from other comparative ailments and furthermore for foreseeing the guess of RA patients [32, 33, 34, 35, 36].

Conclusions

Our study concludes the importance of determining the values of these parameters to know its effects in acute and chronic tonsillitis patients’ diseases.

References


30- RongchunShen, BM; XiaojuanRen, BM; Rongrong Jing, MM; XianjuanShen, MM; Jianping Chen, MM; ShaoqingJu, MD and Chunlan Yang, BM (2015). RF, Anti-CCP Antibody, CRP and ESR for the clinical diagnosis of RA, Lab. Medicine,46(3): 226-229.


